WHAT IS CLAIMED IS:

1. A gene transfer vector comprising a nucleic acid sequence which encodes at least an immunogenic portion of one or more exotoxins of *Bacillus anthracis* and a heterologous sorting signal, wherein the nucleic acid sequence comprises codons expressed more frequently in humans than in *Bacillus anthracis*.

2. The gene transfer vector of claim 1, wherein the nucleic acid sequence encodes at least an immunogenic portion of one or more exotoxins selected from the group consisting of protective antigen (PA), edema factor (EF), and lethal factor (LF).

3. The gene transfer vector of claim 2, wherein the nucleic acid sequence encodes protective antigen.

4. The gene transfer vector of claim 2, wherein the nucleic acid sequence encodes an oligomerization mutant of protective antigen.

5. The gene transfer vector of claim 1, wherein the nucleic acid sequence encodes at least an immunogenic portion of each of two or more exotoxins of *Bacillus anthracis*.

6. The gene transfer vector of claim 1, wherein the heterologous sorting signal directs the exotoxin to a subcellular sorting pathway.

7. The gene transfer vector of claim 6, wherein the subcellular sorting pathway is selected from the group consisting of an extracellular pathway, a cytoplasmic pathway, a cell membrane pathway, a lysosome pathway, an endoplasmic reticulum pathway, and a degradative pathway.

8. The gene transfer vector of claim 1, wherein the heterologous sorting signal is a lysosomal-associated membrane protein-1 sorting signal.

9. The gene transfer vector of claim 1, wherein the nucleic acid sequence further encodes a heterologous signal peptide.

10. The gene transfer vector of claim 9, wherein the heterologous signal peptide is a lysosomal-associated membrane protein-1 signal peptide.

11. The gene transfer vector of claim 1, which is a non-viral vector.

12. The gene transfer vector of claim 11, wherein the non-viral vector is a plasmid formulated with a lipid or a polymer.

13. The gene transfer vector of claim 1, which is a viral vector.

14. The gene transfer vector of claim 13, wherein the viral vector is an adenoviral vector.

15. The gene transfer vector of claim 14, wherein the adenoviral vector is replication-deficient.

16. The gene transfer vector of claim 15, wherein the adenoviral vector is a human adenoviral vector.

17. The gene transfer vector of claim 15, wherein the adenoviral vector is a non-human primate adenoviral vector.

18. The gene transfer vector of claim 17, wherein the adenoviral vector is a chimpanzee adenoviral vector.

19. The gene transfer vector of claim 1, wherein the gene transfer vector transduces antigen presenting cells.

20. The gene transfer vector of claim 1, which comprises a replication-deficient adenoviral vector comprising a nucleic acid sequence encoding at least an immunogenic portion of protective antigen of *Bacillus anthracis* and a heterologous sorting signal, wherein the nucleic acid sequence comprises codons expressed more frequently in humans than in *Bacillus anthracis*.

21. A pharmaceutical composition comprising the gene transfer vector of claim 1 and a pharmaceutically acceptable carrier.

22. A method of producing an immune response against *Bacillus anthracis* in a host, which method comprises administering to the host a gene transfer vector having a nucleic acid sequence which encodes at least an immunogenic portion of one or more

exotoxins of *Bacillus anthracis* and a heterologous sorting signal, wherein the nucleic acid sequence comprises codons expressed more frequently in humans than in *Bacillus anthracis*, and wherein the nucleic acid sequence is expressed to produce the immunogenic portion of the one or more exotoxins in the host, thereby producing an immune response against *Bacillus anthracis*.

23. The method of claim 22, wherein the nucleic acid sequence encodes at least an immunogenic portion of one or more exotoxins selected from the group consisting of protective antigen (PA), edema factor (EF), and lethal factor (LF).

24. The method of claim 23, wherein the nucleic acid sequence encodes protective antigen.

25. The method of claim 23, wherein the nucleic acid sequence encodes an oligomerization mutant of protective antigen.

26. The method of claim 22, wherein the nucleic acid sequence encodes at least an immunogenic portion of each of two or more exotoxins of *Bacillus anthracis*.

27. The method of claim 22, wherein the heterologous sorting signal directs the exotoxin to a subcellular sorting pathway.

28. The method of claim 27, wherein the subcellular sorting pathway is selected from the group consisting of an extracellular pathway, a cytoplasmic pathway, a cell membrane pathway, a lysosome pathway, an endoplasmic reticulum pathway, and a degradative pathway.

29. The method of claim 22, wherein the heterologous sorting signal is a lysosomal-associated membrane protein-1 sorting signal.

30. The method of claim 22, wherein the nucleic acid sequence further encodes a heterologous signal peptide.

31. The method of claim 30, wherein the heterologous signal peptide is a lysosomal-associated membrane protein-1 signal peptide.

32. The method of claim 22, wherein the gene transfer vector is a non-viral vector.

33. The method of claim 32, wherein the non-viral vector is a plasmid formulated with a lipid or a polymer.

34. The method of claim 22, wherein the gene transfer vector is a viral vector.

35. The method of claim 34, wherein the viral vector is an adenoviral vector.

36. The method of claim 35, wherein the adenoviral vector is replication-deficient.

37. The method of claim 36, wherein the adenoviral vector is a human adenoviral vector.

38. The method of claim 36, wherein the adenoviral vector is a non-human primate adenoviral vector.

39. The method of claim 38, wherein the adenoviral vector is a chimpanzee adenoviral vector.

40. The method of claim 22, wherein the gene transfer vector is administered to antigen presenting cells of the host.

41. The method of claim 40, wherein the antigen presenting cells are dendritic cells.